REMARKS/ARGUMENTS

The Examiner's comments have been well noted and in order to more clearly define the exact nature of our invention it has been necessary to rewrite some of the application; including all the Claims, the Abstract, one paragraph from the Background of the Invention, one paragraph from the Objects of the Invention, and twelve paragraphs from the Description of Preferred Embodiment. All minor amendments found to be in non-compliance (37 CFR 1.121) from previous papers #5, #7 and #8 have also been incorporated. No new matter has been added, however, some rewriting was necessary to correct imprecise and unclear wording.

Re: Section 112 Objections:

1. *"Claims 9 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Claims 9 and 14 remain rejected under 35 U.S.C. 112, second paragraph, because it is confusing that the micro-emulsion forming additive comprising a surfactant, co-surfactant, water and balance being hydrocarbon that appear to be in conflict with claim 5 that does not include hydrocarbon in the said additive.* Also, *"Claims 9 -18 will not be treated on the merits because the scope of the claims cannot be determined."*

Accordingly, the claims of record (1 to 19) have all been rewritten and replaced with new claims (20 to 35) in order to address Section 112 objections as well as define the invention more particularly over the cited references.

2. *The phrase "the remaining portion is liquid hydrocarbon fuel" is broader than and is in conflict with page 9, lines 17-20 that the concentrated additive is pre-diluted with kerosene (or some other solvent/distillate)."*

When the kerosene is mentioned on page 9, lines 17-20, paragraph [0035] of the instant application it is simply being employed as an inactive dilutant. When being used for this purpose, the kerosene was never intended to be considered an active functional component of the fuel additive concentrate. However, since applicant's examples 7, 8, 10, 11 and 16 have always employed kerosene as a functional component, and to avoid further confusion, all the rewritten claims now include the use of an extra ingredient called a "hydrocarbon solvent" to represent the kerosene when it is being used this way.

Re: Section 103 Objections:

1. *"Claims 1-8 and 19 for reasons made of record in paper No. 2 dated September 5, 2002 remain rejected under 35 U.S.C. 103(a) as being unpatentable over patents of Grangette, McCoy and Wenzel. The Admitted prior art Grangette renders the instant claim additives obvious because of the lower range of 100ppm water of Grangette suggests the upper range of 95ppm water of the instant claims, in the absence of evidence of record to the contrary".*

The Grangette patent (US #4,396,400) is admitted prior art and is clearly distinguishable over the instant application. Grangette discloses 100 to 5,000ppm water in the fuel (column 4, line 5 to 6). The instant application deals only with those fuels dosed with an extra 5 to 95ppm water (page 10, line 5, paragraph [0037]). Although the water content ranges approach each other, they actually teach moving in opposite directions. Grangette discloses that 1,000ppm water content gives optimum overall improvement (column 6, lines 10 to 12). Applicants teach that 20 to 80ppm water is preferred (page 10, line 5, paragraph [0037]).

Further consideration of the instant application test data examples #13 to #20 are submitted as the requested "*evidence of record to the contrary.*" In these eight examples, vehicles treated with additional water (significantly less than 100ppm) all achieved remarkable emissions reductions as well as fuel economy improvements (page 31, table 6, paragraph [0209]). This clearly demonstrate that below 100ppm additional water, emissions reductions and fuel economy benefits can improve as the water content reduces further. More significantly, not only do the benefits increase, but the treatment costs reduce proportionally. There is therefore a threshold in the cost/benefit ratio which cannot be crossed except in fuels treated with less than 100ppm water. No prior art demonstrates this new and unexpected result.

"It is the Examiner's position that from 0% to 25% by weight co-surfactant read on the component not being present. When the co-surfactant is absent from the said composition, the instant claims comprises 10 to 65% by weight water and 90 to 35% surfactants and the instant ranges are rendered obvious by the range of surfactants to water of Grangette."

Applicants have therefore narrowed the percentage ranges of water and surfactant (refer to instant application new claim #20). Surfactants are now 80 to 30%; water is 10 to 60%.

Grangette does not actually state a ratio range of surfactant to water; this ratio can only be calculated from examination of the various examples. This calculation reveals a ratio range of surfactant to water of from 0.6:1 to 0.25:1.

Applicants, however, do state a ratio range for the surfactant to water. This range is 8:1 to 0.5:1 (page 9, line 7, paragraph [0033]). This difference in surfactant to water ratio (8:1 to 0.5:1 vs. 0.6:1 to 0.25:1) now clearly demonstrates a major significant difference between the instant application and Grangette.

Applicants also couple this unusual surfactant to water ratio together with the low water content as the essence of the present invention (page 11, lines 9 to 11, paragraph [0044]).

Grangette teaches the quantity of surfactant utilized is proportional to the quantity of water to be solubilized (column 3, lines 53 to 54). However, Grangette clearly does not follow this teaching. This is particularly true in the only two Grangette examples using less than 1,000ppm water. Examples #2 (column 5) and #17 (column 8) each use only 100ppm water but have a surfactant to water ratio of only 0.25:1. Fuel emulsions containing water near the critical 100ppm level need **more** surfactant (to compensate for the 75ppm water dissolved in the fuel). However, Grangette actually uses **less** surfactant.

Stated in a more general way, Grangette fuels always use more water than surfactant, whereas applicant's fuels always use less water than surfactant (except only in the present invention example #20). Therefore, applicants resubmit that Grangette does not render obvious the surfactant to water ratios of the instant application.

"The teachings of McCoy and Wenzel are incorporated into Grangette." Also, *"McCoy teaches non-ionic surfactants and Wenzel teaches cationic surfactants."* Also, *"McCoy and Wenzel provide the motivation that the same additives used in diesel fuel emulsions e.g. gas oil, have the same functional properties in gasoline fuel emulsion providing the motivation that the fuel composition of Grangette can be used in gasoline and diesel fuel."*

The Grangette patent employs an amphoteric betain derivative as the emulsifying surfactant. McCoy teaches nonionic surfactants and Wenzel teaches cationic surfactants as the emulsifiers. There is no suggestion in the references themselves that they be combined. Thus, the applicant submits that any combination of Grangette with the other two references is an improper one, absent any showing in the references themselves that they can or should be combined. Even if McCoy and Wenzel could be incorporated into Grangette, and the resulting fuel emulsions used in both gasoline and diesel fuel, this would still not show the instant application or render it obvious because of the other significant differences. Applicants deliberately disclose that various types of surfactants could be used to produce fuel emulsions (page 11, lines 12 to 14, paragraph [0045]).

For clarity, applicants restate the significant differences between the present invention and Grangette: Applicant's fuel emulsions teach less than 100ppm water, Grangette teaches more than 100ppm. Applicants teach more surfactant than water, Grangette teaches less surfactant than water. Applicant's fuel emulsions are prepared by using a pre-mixed additive, Grangettes fuels are not. Applicant's fuel emulsions recognize and cross the cost/benefit threshold necessary for commercial success, the Grangettes fuels do not.

2. McCoy (3,876,391). Unlike the instant application, the McCoy fuel emulsions were not built by incorporating a pre-mixed additive into a commercially available fuel. Water soluble surfactants and oil soluble surfactants were separately added to the water and the fuel (column 7, lines 44 to 48 and column 8, lines 1 to 12). This would make production complicated, time consuming and expensive for any emulsion fuel producer (since all of the fuel must pass through the production facility).

The McCoy fuel emulsions have typical water contents from about 60,000 to 160,000ppm (column 6, line 35). The instant application uses only about 5 to 95ppm water (page 10, line 5, paragraph [0037]). McCoy emulsion fuels would therefore present a significant danger to engines if the emulsion broke. The instant application would not present such a danger.

McCoy fuel emulsions use a total surfactant content of 60,000 to 160,000ppm (column 6, line 36). Applicants use about 10 to 400ppm surfactant (page 10, line 3, paragraph [0037]). Since the extra cost to produce the emulsion fuel is mostly in the surfactants, this makes the McCoy fuel emulsions about 500 times more expensive than

the instant application, just for the major raw ingredient. The McCoy fuels could never be cost effective.

Unlike the instant application, the McCoy fuel emulsions do not claim to improve fuel economy or reduce exhaust emissions, their primary function is to use the emulsified water as a vehicle to carry water soluble octane boosters (column 2, lines 32 to 34).

3. Wenzel (4,083,698). Despite the claims say, Wenzel seems almost exclusively preoccupied with the low temperature stability of fuel/water micro-emulsions. There are 87 tests, of which only one test (example #6) actually uses emulsion fuel in an engine. All the other tests are concerned with low temperature emulsion fuel stability.

Unlike the instant application, the Wenzel fuel emulsions were not built by incorporating a pre-mixed additive into a commercially available fuel. All the surfactants were pre-blended (column 9, lines 35 to 50) and then mixed into a gasoline together with co-surfactants and water (column 11, lines 47 to 57). This would make fuel production complicated, time consuming and expensive for any emulsion fuel manufacturer (since all of the fuel must pass through the production facility).

Wenzel claims fuel emulsions having a water content range from about 5,000 to 25,000ppm (column 5, lines 62 to 63). Applicants use only about 5 to 95ppm water (page 10, line 5, paragraph [0037]). Wenzel emulsion fuels would therefore present a significant danger to engines if the emulsion broke. The instant application would not present such a danger.

Wenzel does not actually state a range of surfactant content, so using the only example cited by Wenzel which is actually used in an engine (example #6) gives a surfactant content of 69,000 to 105,000ppm in the fuel. The instant application uses about 10 to 400ppm surfactant (page 10, line 3, paragraph [0037]). Since the extra cost to produce the emulsion fuel is mostly in the surfactants, this makes the Wenzel fuel emulsions about 400 times more expensive than the instant application, just for the major raw ingredient. The Wenzel fuels could never be cost effective.

Unlike the instant application, the Wenzel fuel emulsions do not claim to improve fuel economy, their primary function seems to remain stable as the temperature changes.

Re: Cited But Non-Applied References:

1. Goddard (4,605,422), Hellsten (4,315,755), Wenzel (4,002,435), Friberg (3,902,869) and Kirschbraun (1,701,621). These references have been cited but not applied against any claim. Applicants have reviewed them, but none show the present invention or render it obvious.

Additional Reasons Mitigate in Favor of Unobviousness:

1. The invention can be employed in a cost effective manner not previously realized. This is by using the fuel economy improvements coupled with the low treatment level. Up until now, those skilled in the art have never disclosed a cost effective emulsion fuel additive. Applicant's additives can be sold at a typical retail level treatment cost of only

about 4 cents per gallon of fuel treated (copy of assignee's web site price list enclosed). If fuel costs are $1.50 per gallon, saving 10% (refer to instant application test #14) would mean saving 15.0 cents per gallon. Comparing the cost of treatment (4 cents per gallon) with the fuel savings (15.0 cents per gallon) clearly demonstrates cost effectiveness.

2. The instant application also solves an unrecognized problem associated with low water content fuel emulsions. Without extra surfactants, any low water content fuel emulsion (typically 50ppm added water) would slowly be overwhelmed by the background level of dissolved water always present in all commercially available fuels (typically 50 to 100ppm). By employing unusually high surfactant to water ratios of typically 3:1 to 1:1 (page 9, line 8, paragraph [0033]), applicants achieve the long term emulsion fuel stability essential to commercial success.

3. Applicant's Patent Application (#20020095859) was published July 25, 2002. So far as the applicants are aware, no public challenges have yet been made against this application in the one year that it has been in the public domain. This mitigates in the applicant's favor.

4. Fuel additives in accordance with the instant application are already being sold by the applicant's assignee (H2OIL Corporation) in several countries to individuals with various driving habits for use in both gasoline and diesel fuel. There are few complaints and none indicating that the mixtures become unstable.

5. Applicant's fuel additives have already achieved a significant level of commercial success. Assignee's additives are currently the #1 selling retail fuel additive in Japan (sold by Kure under the trade names "Power Booster" and "Super Power Booster"). Assignee has also achieved substantial sales in China, Thailand, Singapore and Malaysia. During the last three years, assignee overseas sales for fuel additives have been well over $3 million (verification available on request).

6. The instant application is in a crowded art (fuel emulsions). It is well recognized that in a crowded art, even a small step forward is worthy of patent protection. While the instant application is submitted to be far more than a small step forward, nevertheless this factor mitigates in the applicant's favor.

7. If the instant application were in fact obvious; because of its advantages, those skilled in the art would surely have implemented it by now. The prior art references cited by the Examiner are all out-of-force patents (the earliest cited patent issued in 1929). The fact that those skilled in the art have still not implemented the instant application by now, despite its great advantages, indicates that it is clearly not obvious.

8. The instant application solves a long-felt, long-existing, but unsolved need. This would be a simple and cost effective means to quickly and easily reduce urban air pollution from vehicle exhausts (fuels using applicant's fuel additive have significantly

reduced exhaust emissions). It is easily mixed with the fuel. No fuel distribution infrastructure changes are required. Once in the fuel supply, applicant's fuel additive would quickly reach all of the vehicle population. No vehicle modifications are required. The low water content makes it safe to use. Fuel savings more than compensate for additive costs (most users actually make a profit, see paragraph 1. above).

9. Applicant's fuel additives have received professional recognition. In 1994, applicants were invited by the United Nations to attend a Hong Kong conference on transport related urban air pollution problems (copy of official U.N. invitation is attached). Also in 1994, a Forbes Magazine article describes the applicant's fuel additive technology as "one of the best 25 emerging environmental technologies in the world" (copy of magazine article enclosed).

10. Attempts have already been made to copy the applicant's fuel additive technology by an infringer (Peking University, China). Moreover, this infringer has made laudatory statements about the additive. Copy of assignee's web site (H2OIL) and infringer's web site (PKU) are attached for comparison (also note that PKU even copies the assignee's literature word for word). This infringer was apparently unable to copy the present invention until a sample of the assignee's fuel additive was obtained from a local Chinese distributor. Infringer was then able to try reverse engineering, but only managed to produce an inferior product (now temporarily withdrawn from the market, due to technical problems).

Reconsideration Request:

Further to the above additional reasons, and since the novel features of the instant application provide new and unexpected results over any reference, applicant submits that these new results indicate unobviousness and hence patentability. Accordingly, applicants respectfully request reconsideration and allowance of the instant application with the above new claims.

Respectfully submitted,

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